Advances of the DRIAR Project: Dry-Rifting In the Albertine-Rhino Graben, Uganda

D. Sarah Stamps (Virginia Tech, USA, dstamps@vt.edu), Estella Atekwana (University of California, Davis, USA), Suzan van der Lee (Northwestern University, USA), Rob Evans (Woods Hole Oceanographic Institution, USA), Michael Taylor (University of Kansas, USA), Andrew Katumwehe (Midwestern State University, USA), Eliot Atekwana (University of California, Davis, USA), Fred Tugume (Ministry of Energy and Mineral Resources, Uganda), John Mary Kiberu (Makerere University, Uganda), Stewart Fishwick (Leicester University, U.K.), Peter H. Barry (Woods Hole Oceanographic Institution, USA), Saemundur Halldorsson (University of Iceland, Iceland), Folarin Kolawole (Columbia University, USA), Georg Rümpker (Goethe Universitat, Germany), Asenath Kwagalakwe (Virginia Tech, USA), Daniel Mongovin (University of Kansas, USA), Hillary Mwongyera (University of Kansas, USA), Joy Foluso (University of California, Davis), Albert Kabanda (Northwestern University), Ben Alonzo (Northwestern University), Esha Islam (Virginia Tech, USA), Damilola Ola (Midwestern State University, USA), Patrick Boston (Midwestern State University, USA), Emmanuel Njinju (University of California, Davis, USA), Joan Nakajigo (Makerere University, Uganda), Betty Nagudi (Makerere University, Uganda), Richard Birungi (Ministry of Energy and Mineral Resources, Uganda)

Continental rifting is a critical component of the plate tectonics paradigm and is known to occur in more than one mode, phase, or stage. While continental rifting is typically accompanied by magmatism, some rifts are magma-poor. This project focuses on advancing our understanding of the fundamental processes associated with magma-poor (dry) rifting and we study the Albertine-Rhino Graben, Uganda as the natural laboratory. Here, we provide an overview and progress update on the NSF-funded DRIAR (Dry Rifting In the Albertine-Rhino graben, Uganda). Our goal is to use geophysical, geological, geochemical, and geodynamic techniques to investigate rifting in the northern Western Branch of the East African Rift System in Uganda. We test 3 hypotheses: (1) in magma-rich rifts, strain is accommodated through lithospheric weakening from melt, (2) in magma-poor rifts, melt is present below the surface and weakens the lithosphere such that strain is accommodated by upper crustal extension, and (3) in magma-poor rifts, there is no melt at depth and strain is accommodated along pre-existing weak structures such as inherited compositional, structural, and rheological lithospheric heterogeneities. Fieldwork in 2022 included geodesy, magnetotelluric, structural geology, seismology, gravity collection, and geochemical sampling. Fieldwork in 2023 has involved collecting campaign GNSS data. We also conducted the DRIAR project training school in July 2022 in Uganda in which 30 people participated. Geodynamic modeling of melt generation and the development of a crustal model, as well as geochemical, magnetotelluric, seismological, and neotectonic analyses are now underway. The content of this presentation focuses on both scientific and broader-impact advances of the DRIAR project.

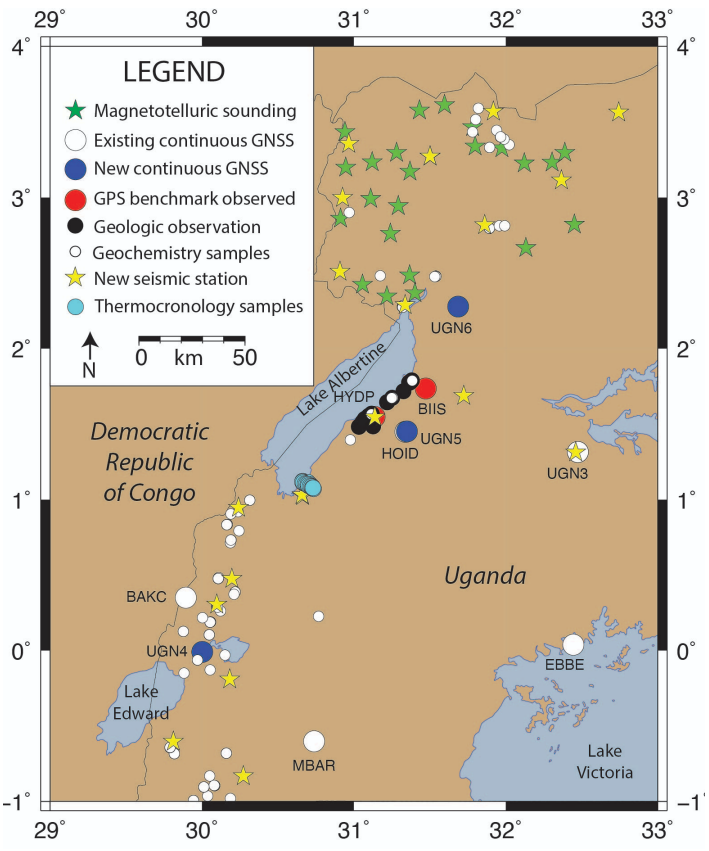

Fig. Map showing the 2022-2023 fieldwork undertaken.